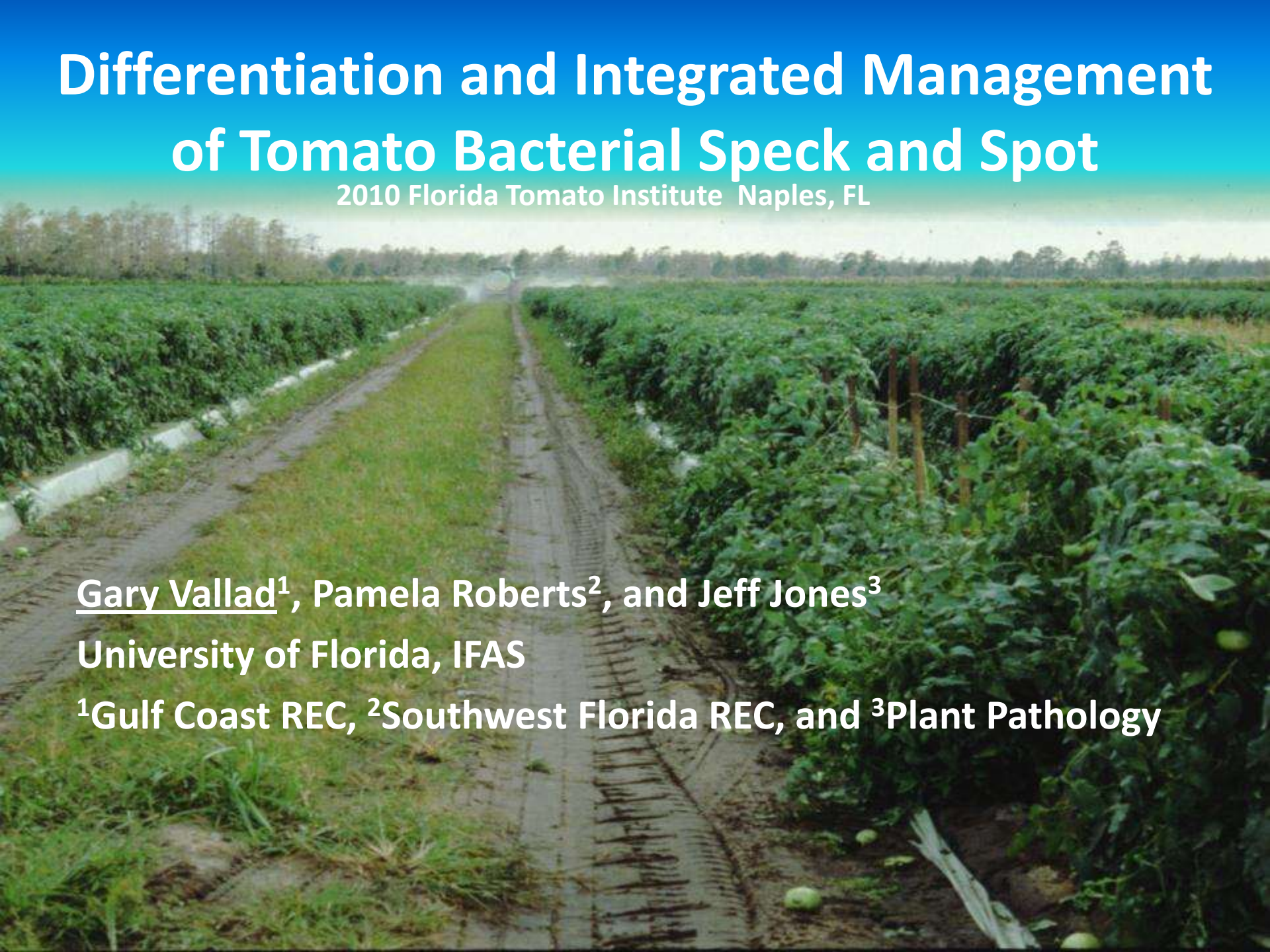
Differentiation and Integrated Management of Tomato Bacterial Speck and Spot

2010 Florida Tomato Institute Naples, FL



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[1]Gulf Coast REC, [2]Southwest Florida REC, and [3]Plant Pathology

1. Pseudomonas epidemic of 2010
2. Bacterial spot & speck management
3. New tools…

Spring 2010:
It was cold outside!

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Number of freeze events in 2010 (Jan. - March).

	No. days with temperatures:	
Location	≤ 32°F	≤ 28°F
Balm	11	4
Ona	11	4
Immokalee	4	1
Homestead	1	0

* Based on records from FAWN database (http://fawn.ifas.ufl.edu/)

Spring 2010:
It was cold and wet outside!

Rain totals and number of rain events ≥ 0.10 inches in 2010 (Jan. - May).

	Jan.		Feb.		March		April		May	
Location	Total	No.	Total	No.	Total	No.	Total	No.	Total	No.
Balm	3.18	6	2.23	5	6.14	7	2.80	5	0.89	4
Ona	1.95	4	2.39	2	5.92	6	2.84	3	6.48	7
Immokalee	2.08	5	2.68	5	8.62	8	7.21	6	5.01	4
Homestead	0.92	4	4.12	4	2.35	4	4.43	5	4.53	4

* Based on records from FAWN database (http://fawn.ifas.ufl.edu/)


Spring 2010 – Collier Co.
Photo Credit: G. McAvoy

Collier Co. Symptoms:

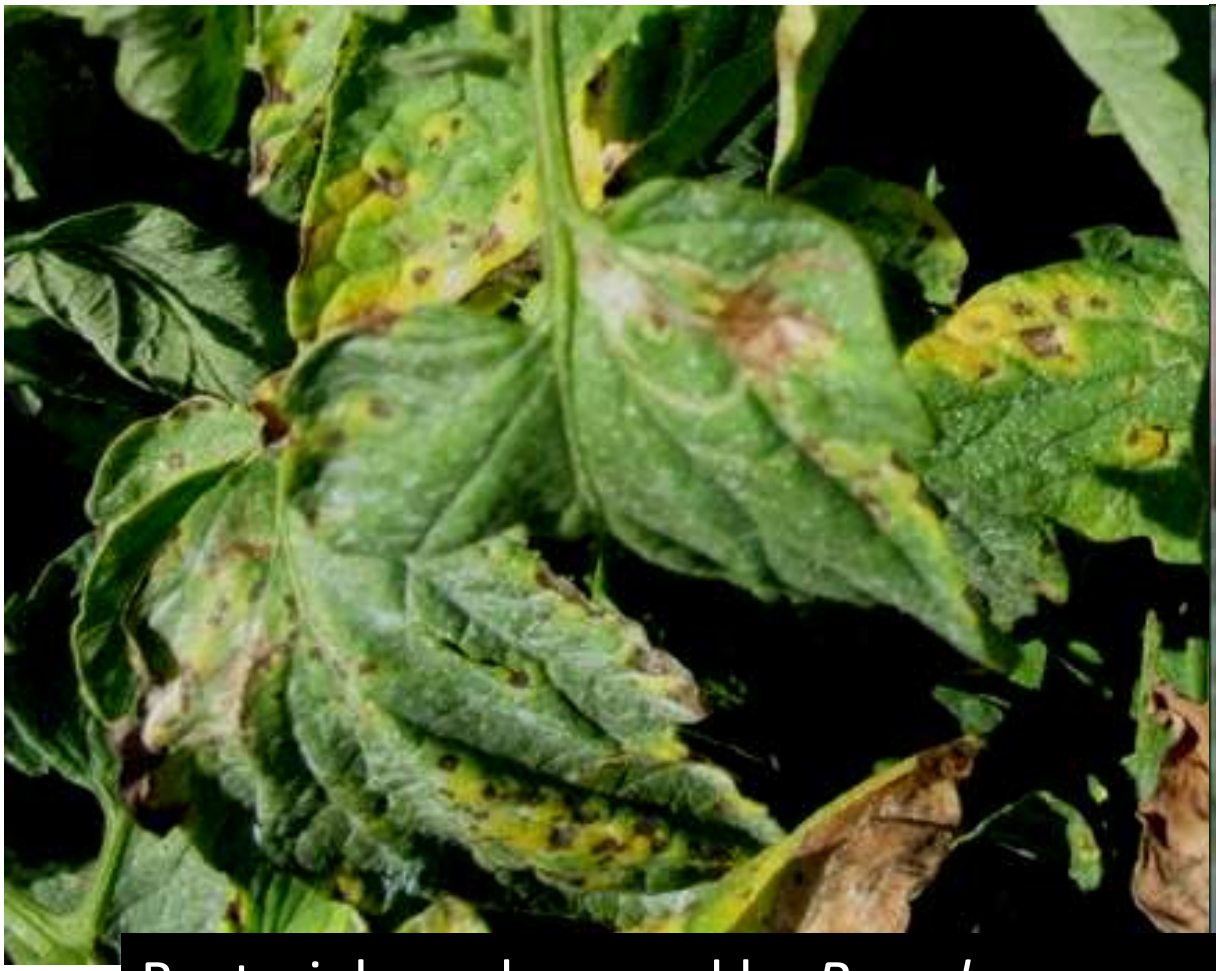
- Severe foliar lesions;
  - angular with some chlorosis
- Foliar blighting
- Severe stem lesions
  - mostly epidermis
  - resembled late blight
- Severe fruit specking
- Aborted flowers


Spring 2010 – Collier Co.
Photo Credit: G. McAvoy

Manatee Co. Symptoms:

- Moderate foliar lesions;
  - angular with some chlorosis
- Foliar blighting
- Minor stem lesions
  - mostly epidermis
- Some fruit specking
  - even in hot weather
- Symptoms persisted through June & July


Is this really bacterial speck??



Bacterial speck caused by *Pseudomonas syringae* pv. *tomato*

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Bacterial spot caused by *Xanthomonas perforans*

Was this truly Bacterial Speck??

- Of 37 suspect *Pseudomonas* strains collected:
  - 36/37 strains were fluorescent on King's B.
  - All but 6 tested oxidase (+).

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  ***for Pst or Pss usually enough to make a diagnosis

Was this truly Bacterial Speck??

- Of 37 suspect *Pseudomonas* strains collected:
  - 36/37 strains were fluorescent on King's B.
  - All but 6 tested oxidase (+).
- Additional tests for levan, pectinase, ice-nucleation, HR, pathogenicity, and FA analysis.
  - *Pseudomonas syringae* pv. *tomato*
  - *Pseudomonas syringae* pv. *syringae*
  - *Pseudomonas viridiflava*

Pseudomonas viridiflava

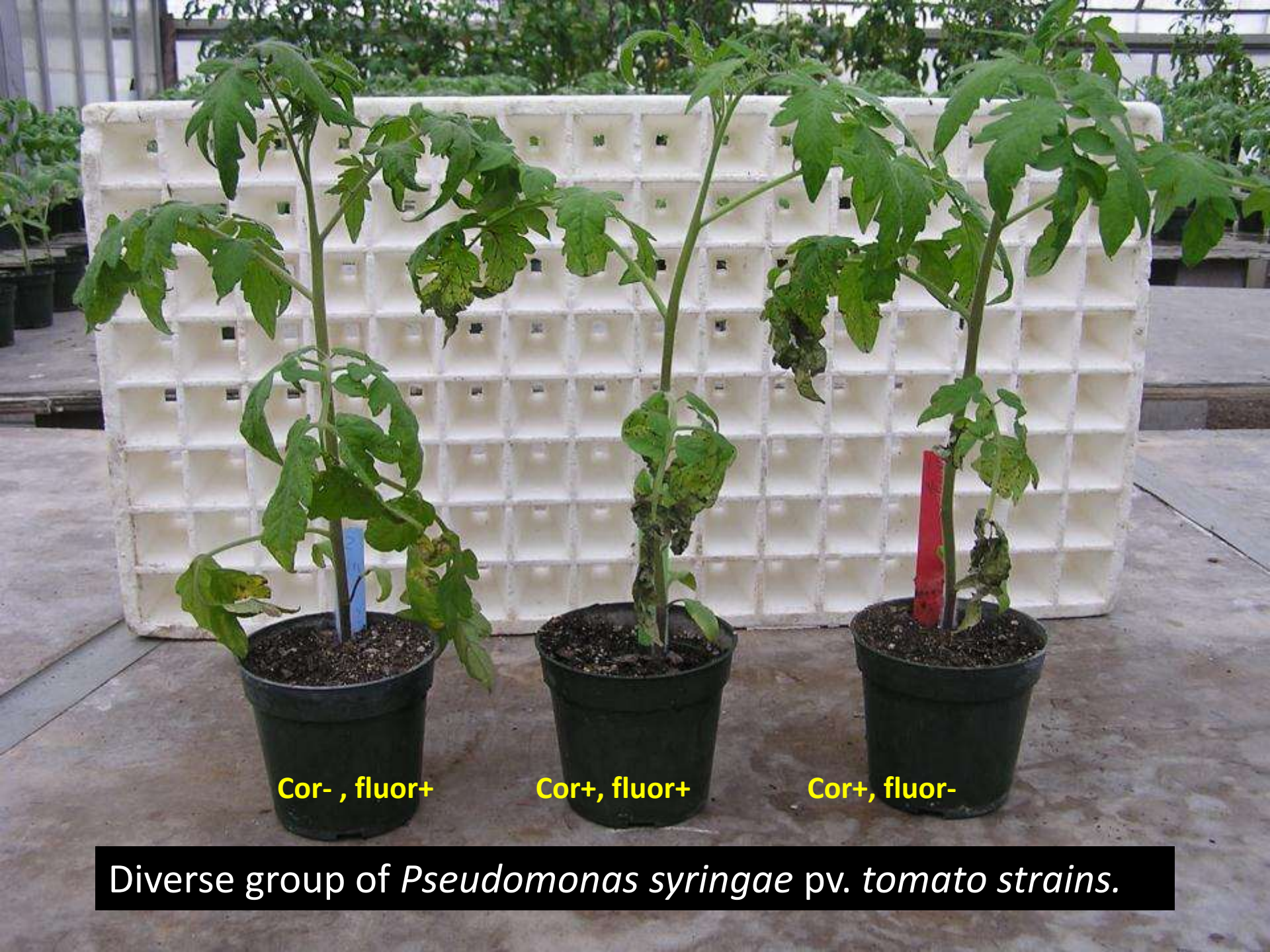
P. syringae pv. *syringae*

Cor- , fluor+

Cor+, fluor+

Cor+, fluor-

Diverse group of *Pseudomonas syringae* pv. *tomato strains.*



Diverse group of *Pseudomonas syringae* pv. *tomato strains.*

Both pathogens require high humidity; rain or dew…and are splash dispersed by rain.
In general, Xanthomonads like it hot >80°F, whereas Pseudomonads favor the cooler temps <85°F

Bacterial Spot & Speck Management:

- Crop rotation – avoid rotations among Solanaceae
- Sanitation – destroy plant debris and volunteers
- Solanaceous weeds – serve as reservoir
- Avoid field operations when foliage is wet
- Host Resistance??
- Healthy, **disease-free** transplants
- Both pathogens are seedborne
- Minimize leaf wetness...avoid heavy rains
- Chemical control…

Regardless of control, conducive weather leads to high disease pressure…

Exclusion is the best tactic!!!

Bacterial Spot & Speck Management:

- **Copper**-based fungicides combined with **mancozeb/maneb** (Cu-tolerance)
- Actigard; use lowest rate and begin weekly applications before disease develops (restricts bacterial growth)
- Streptomycin sulfate; transplant production

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- Streptomycin sulfate; transplant production
- Kasugamycin (no label)
- Quinoxyfen (no label)

Streptomycin sulfate

- An aminoglycoside antibiotic
- Labeled for GH transplant production (200 ppm)
- Currently no field label (registrant is pursuing 24c)…working to update residue & efficacy data…Fall 2011??
- Resistance management will be critical

Kasugamycin (Kasumin 2L, Arysta)

- An aminoglycoside antibiotic (no animal/human use)
- Already used abroad…residue tolerances for US imports
- Label in 2011? Quite restrictive; 100ppm (32floz/50gal), 48floz/season.
- May be a better fit in transplant production.
- Resistance management will be critical

Fall 2008, Tomato Bacterial Spot Trial – Kasumin 2L, Arysta

Treatment	Rate	Trt	9-Oct	15-Oct	27-Oct	13-Nov	AUDPC[z]
Actigard	0.75 oz	4	4.5 a	16.1	0	16.6a	365 a
Kasumin 2L + Transfix	1 qt/50 gal + 3 oz / 50 gal	10	9.0 ab	23.3	0.4	19.8 a	540 ac
Cuprofix Ultra 40D + Penncozeb 75DF	1.5 lb + 2 lb	14	13.8 b	23.3	0.8	43.8 b	832 b
Controls	none	15	13.8 b	25.6	0.8	32.8 b	761 bc
		P > F	***0.023***	***0.5385***	***0.4363***	***0.0022***	***0.0052***

- In 4 of 6 field trials, Kasumin 2L alone was as effective as the standard copper + mancozeb.
- Little advantage mixing Kasumin 2L with other fungicides, including copper + mancozeb.
- In 1 out of 3 field trials, alternating Kasumin 2L with copper + mancozeb improved bacterial spot control over either the copper + mancozeb standard or Kasumin 2L alone.

- Quinoxyfen (Quintec, Dow)
- Active ingredient is actually a quinoline antibiotic
- 2ee label for pepper bacterial spot; 6floz/A; 24 floz limit per season.
- Currently no label for tomato (registrant is pursuing).

Spring 2010, Tomato Bacterial Spot Trial

- **RCBD w/ split plot: 4 reps.**
  - **Treatment as whole plot factor and variety as sub-plot factor**
- **Tomato Varieties**: SecuriTY28, XP-200, and FL47
- High clearance sprayer; 90-120 gal/acre, 210 PSI
- **Pest and stage treated:** 1st application was made 22 Days after planting
- **No. of applications and spray interval:** 6 applications; 10, 10, 8, 13, 8, day interval

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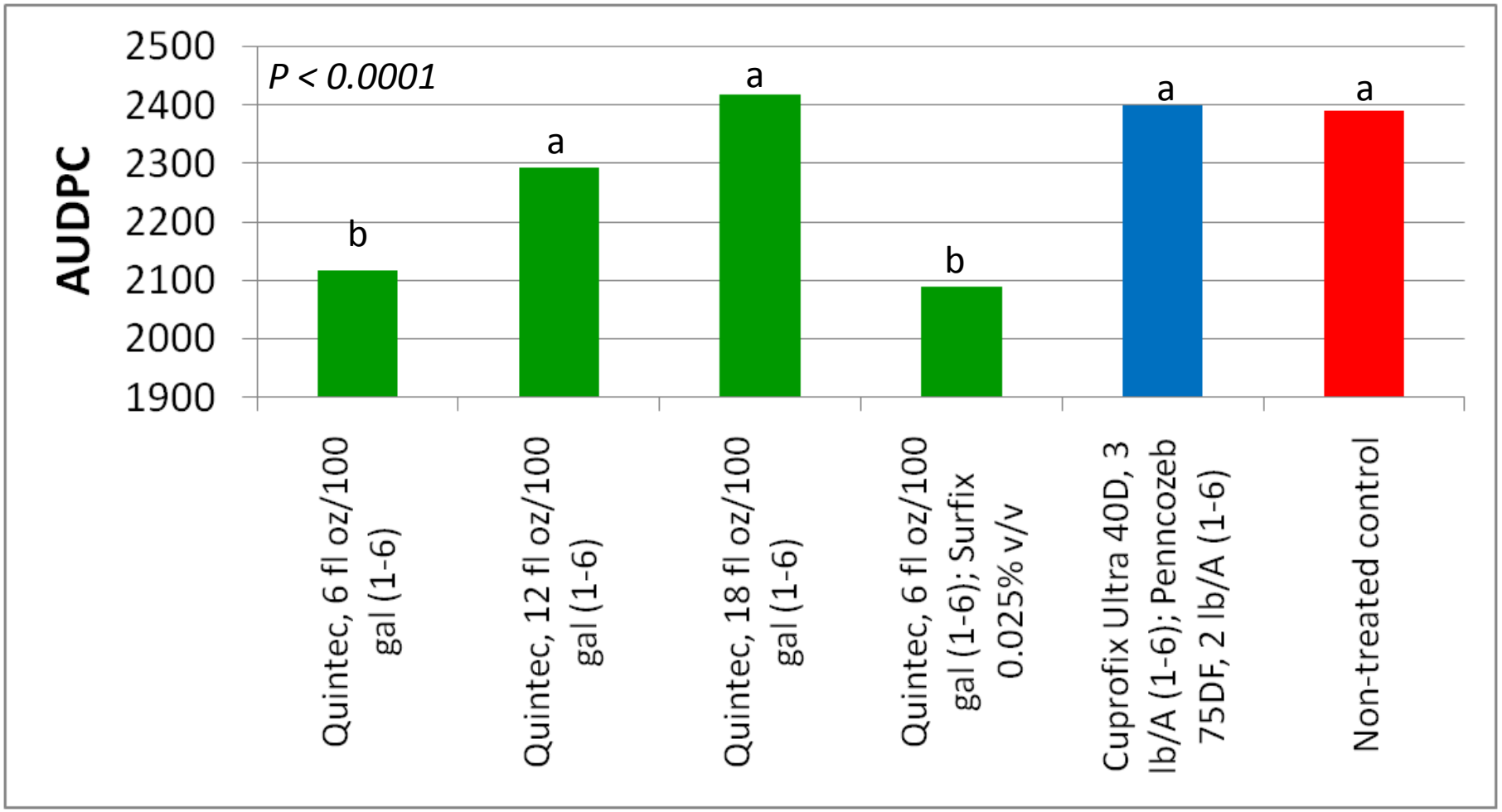

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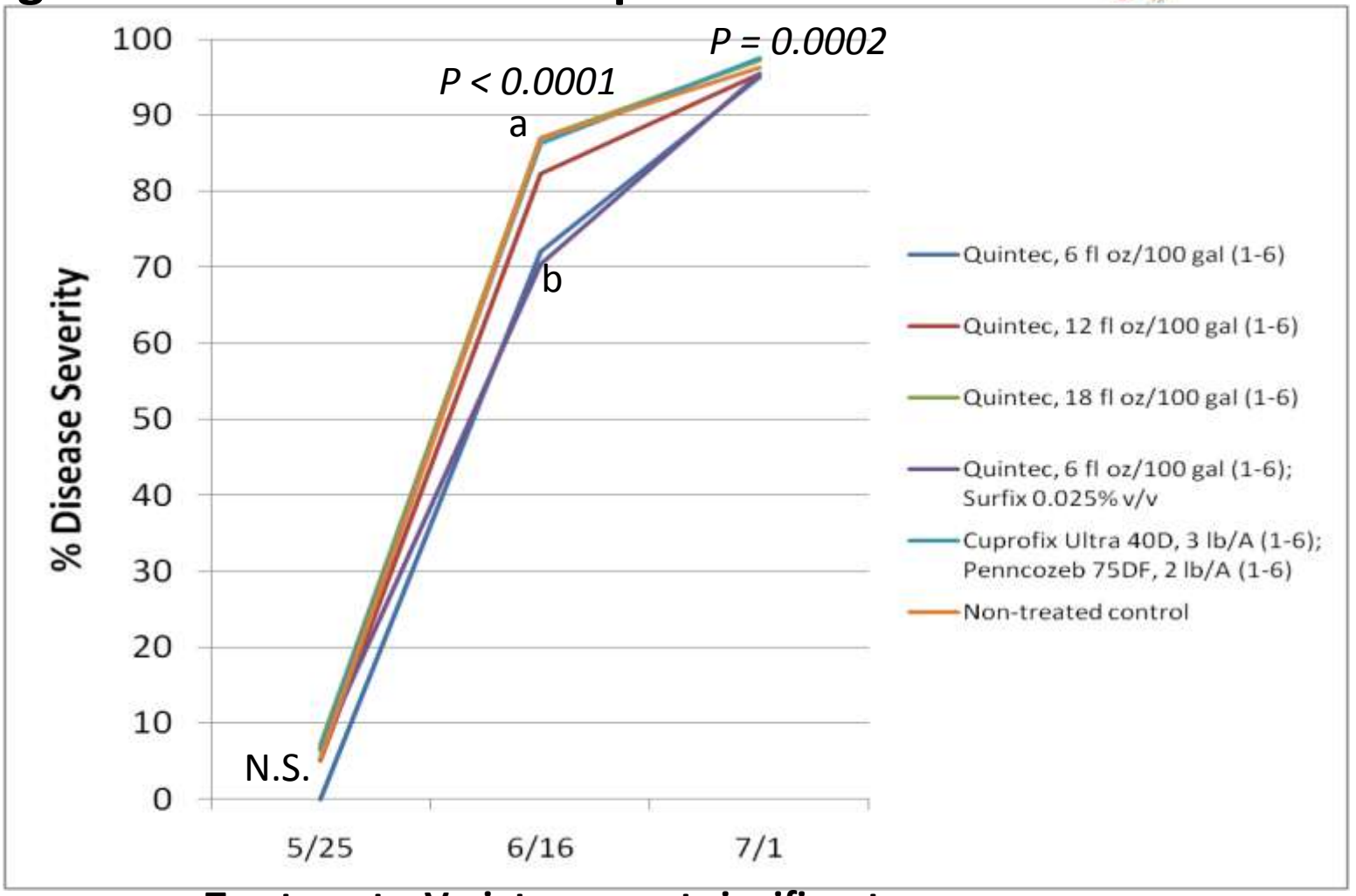

Treatment x Variety was not significant

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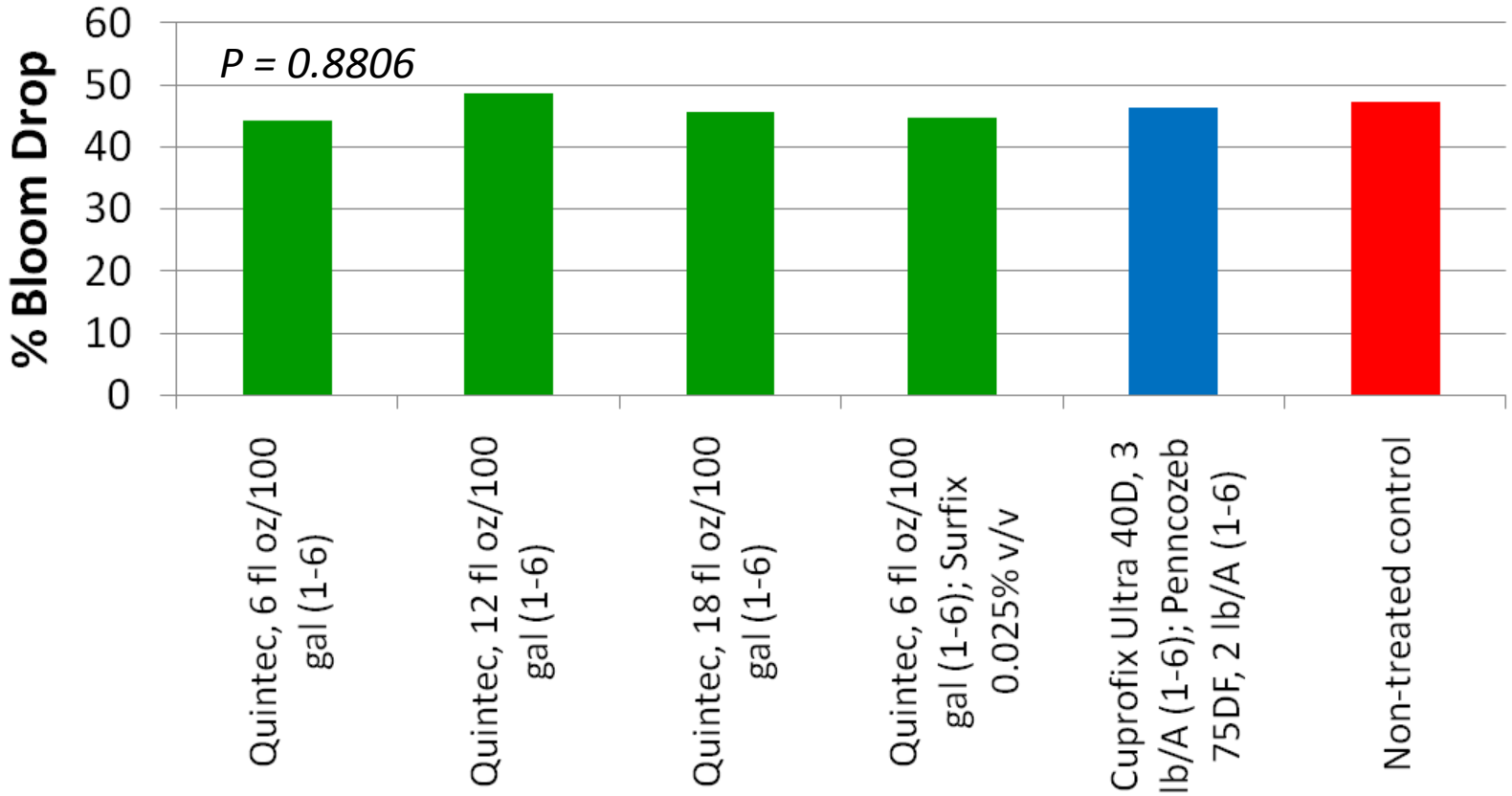
Spring 2010 Tomato Bacterial Spot Trial



Treatment x Variety was not significant. However, SecuriTY28 exhibited 25% less bloom drop than XP-200 & FL47.

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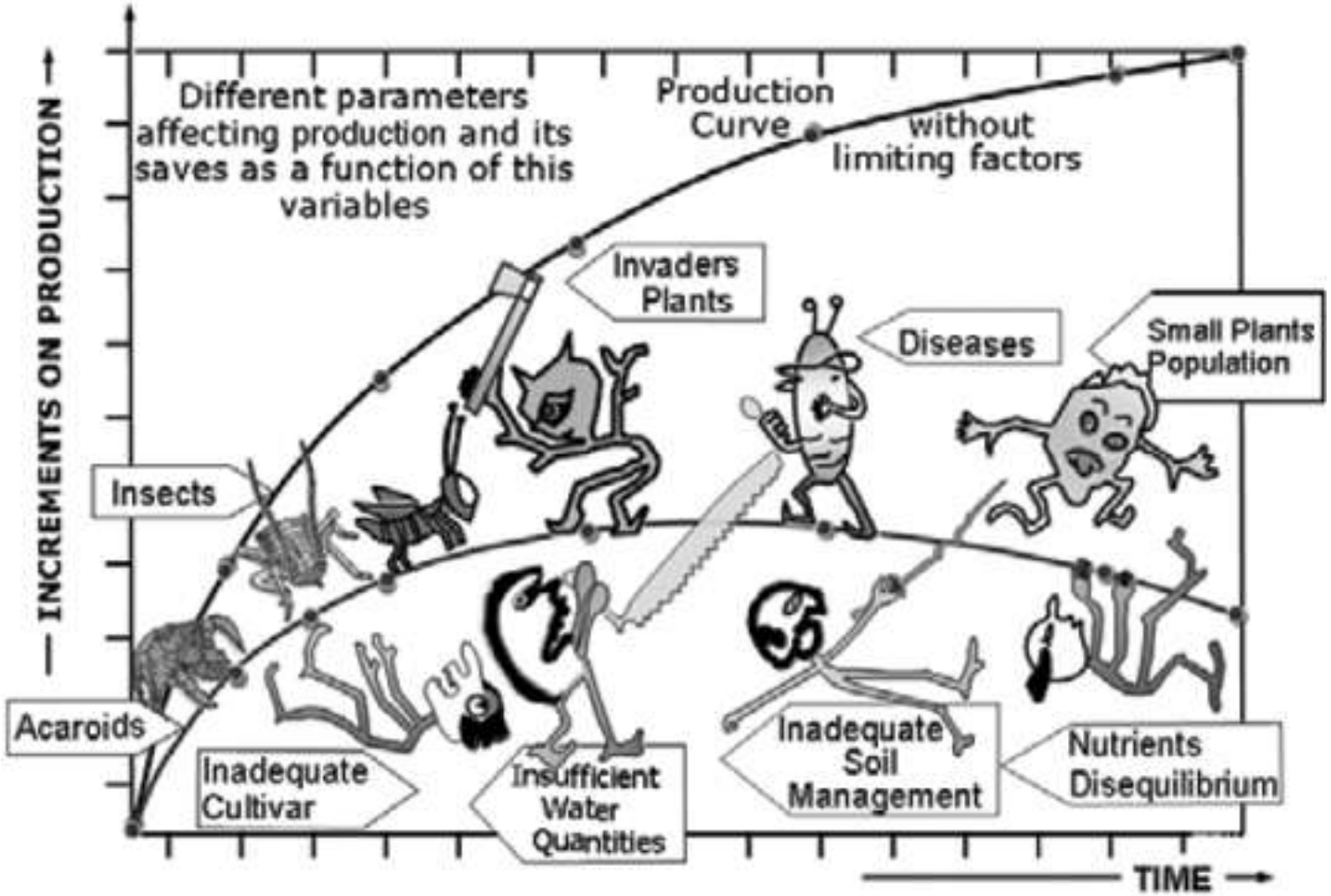
Integration is the key to success!



Polito (2006) An. Acad. Bras. Ciênc. doi: 10.1590/S0001-37652006000400011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